IAN FRAZIER

Terminal Ice

FROM *Outside*

WE ARE MELTING, like the Wicked Witch of the West. Soon there will be nothing left of us but our hat. From Chile to Alaska to Norway to Tibet, glaciers are going in reverse. Artifacts buried since the Stone Age emerge intact from the ice; in British Columbia, sheep hunters passing a glacier find protruding from it a prehistoric man, preserved even to his skin, his leather food pouch, and his fur cloak. All across the north, permafrost stops being perma-. In the Antarctic, some penguin populations decline. In Hudson Bay, ice appears later in the year and leaves earlier, giving polar bears less time to go out on it and hunt seals, causing them to be 10 percent thinner than they were twenty years ago, causing them to get into more trouble in the Hudson Bay town of Churchill, where (as it happens) summers are now twice as long. One day in August of 2000 an icebreaker goes to the North Pole and finds, not ice, but open ocean. The news is no surprise to scientists, who knew that the remote Arctic in summer has lots of ice-free areas. For the rest of us, a disorienting adjustment of the geography of Christmas is required.

Globally, there's a persistent trickling as enormities of ice unfreeze. The Greenland ice sheet loses 13 trillion gallons of fresh water a year, contributing a measurable percentage to the world's annual sea-level rise. Every year, the level of the sea goes up about the thickness of a dime. Other meltwater, and the warming of the planet, which causes water to expand, contribute too. A dime's thickness a year doesn't worry most people, so long as it doesn't get worse, which most scientists don't think it necessarily will anytime

soon, though who can say for sure? The first nation to ratify the Kyoto Protocol on Climate Change is the island of Fiji, one eye on the Pacific lapping at its toes.

And every year, first attracting notice in the seventies, picking up speed in the steamy eighties and steamier nineties, giant icebergs begin splashing into the news. Usually they arrive in single-column stories on an inside page: "An iceberg twice as big as Rhode Island has broken away from Antarctica and is drifting in the Ross Sea . . . It is about 25 miles wide and 98 miles long." "The largest iceberg in a decade has broken off an ice shelf in Antarctica . . . as if Delaware suddenly weighed anchor and put out to sea."

Over the years, a number of Rhode Islands and Delawares of ice, and even a Connecticut, drift into type and out again. The more notable ones are sometimes called "celebrity icebergs," and in the cold Southern Ocean (all the biggest icebergs are from Antarctica) an occasional berg has a longevity in the spotlight that a human celebrity could envy. Iceberg C-2 — as scientists labeled it — drifts for twelve years and 5,700 miles, nearly circumnavigating Antarctica, before breaking into pieces of non-newsworthy size.

Glaciologists say there's probably no connection between global climate change and the increase in the numbers of big Antarctic icebergs. They say the ice shelves at the edge of the continent, from which these icebergs come, have grown out and shrunk back countless times in the past. Our awareness of the icebergs has mainly to do with satellite technology that allows us to see them as we never could before. Still, when you've recently been through the hottest year of the past six centuries and suddenly there's a 2,700-square-mile iceberg on the loose — well, people talk.

In recent times I did a lot of reading about icebergs, some of it at the library of a western university where the air outdoors was so full of smoke from forest fires that people were going around in gas masks. To the old question of whether we will end in fire or ice, the answer now seems to be: both. Fire's photogenic, media-friendly qualities may cause us sometimes to overlook its counterpart and to forget the spectacular entrance ice made onto the modern apocalyptic scene just ninety years ago. Ice plus the *Titanic* spawned nightmares of disaster that never seem to fade. There was a song people used to sing about the *Titanic*, part of which went:

It was on her maiden trip
When an iceberg hit the ship . . .

Of course, the iceberg didn't hit the ship, but the other way around. So forcefully did the iceberg enter our consciousness, however, we assume it must have meant to. Looming unannounced from the North Atlantic on April 14, 1912, it crashed the swells' high-society ball, discomfiting Mrs. Astor, leaving its calling card in the form of a cascade of ice on the starboard well deck, slitting the hull fatally 20 feet below the waterline, and then disappearing into the night. In an instant this "Shape of Ice," as the poet Thomas Hardy called it, had become more famous than all the celebrities onboard. In its dreadful individuality, it had become The Iceberg.

An inflatable toy version of it is sitting on my desk. It came with a *Titanic* bath toy some friends gave my children a while ago. The inflatable iceberg is roughly pyramidal, with three peaks — two of them small and a larger one in the middle. Whoever designed the toy must have seen the widely published photograph supposedly showing The Iceberg, or perhaps saw a cinematic iceberg based on the photo. Hours after the sinking, observers on a German ship reported an iceberg of this shape near the scene, and one of them took the famous photo. Two weeks later, another transatlantic steamer said it saw a different-looking iceberg surrounded by deck chairs, cushions, and other debris in a location where The Iceberg could have drifted. As is the case with many suspects, no positive identification could ever be made.

Northern Hemisphere icebergs like The Iceberg melt quickly once they drift down into the Atlantic, with its warming Gulf Stream. Almost certainly, within a few weeks of shaking up the world, The Iceberg had disappeared. Its ephemerality has only increased its fame; solid matter for just a few historic moments, it continues indefinitely in imaginary realms — for example, as a spooky cameo in the top-grossing movie of all time. The message of The Iceberg, common wisdom has it, concerns the inscrutability of our fate and the vanity of human pride. But when I meditate on ice and icebergs, I wonder if The Iceberg's message might have been simpler than that. Maybe the news The Iceberg bore was more ancient, powerful, planetary, and climatic. Maybe The Iceberg's real message wasn't about us but about ice.

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Icebergs are pieces of freshwater ice of a certain size floating in the ocean or (rarely) a lake. They come from glaciers and other ice masses. Because of the physics of ice when it piles up on land, it spreads and flows, and as it does its advancing edge often meets a body of water. When the ice continues to flow out over the water, chunks of it break off in a process called calving. Some of the faster-moving glaciers in Greenland calve an average of two or three times a day during the warmer months. Icebergs are not the same as sea ice. Sea ice is frozen saltwater, and when natural forces break it into pieces, the larger ones are called not icebergs but ice floes. Icebergs are denser and harder than sea ice. When icebergs are driven by wind or current, sea ice parts before them like turkey before an electric carving knife. In former times, sailing ships that got stuck in sea ice sometimes used to tie themselves to an iceberg and let it pull them through.

A piece of floating freshwater ice must be at least 50 feet long to qualify as an iceberg, according to authorities on the subject. If it's smaller — say, about the size of a grand piano — it's called a growler. If it's about the size of a cottage, it's a bergy bit. Crushed-up pieces of ice that result when parts of melting icebergs disintegrate and come falling down are called "slob ice" by mariners. Students of icebergs have divided them by shape into six categories: blocky, wedge, tabular, dome, pinnacle, and dry-dock. The last of these refers to icebergs with columnar sections flanking a water-level area in the middle, like high-rise apartment buildings around a swimming pool.

At the edges of Antarctica, where plains of ice spread across the ocean and float on it before breaking off, most of the icebergs are tabular — flat on top, horizontal in configuration. In the Northern Hemisphere, because of the thickness of glacial ice and the way it calves, most icebergs are of the more dramatically shaped kinds. Tabular icebergs tend to be stable in the water, and scientists sometimes land in helicopters on the bigger ones to study them. Northern Hemisphere icebergs, with their smaller size and gothic, irregular shapes, often grow frozen seawater on the bottom, lose above-water ice structure to melting, and suddenly capsize and roll. Venturing onto such icebergs is a terrible idea.

Antarctica has about 90 percent of all the ice in the world; most of the rest of it is in Greenland. Those two places produce most of the world's icebergs — about 100,000 a year from the first, about

10,000 to 15,000 from the other. Glaciers in Norway, Russia, and Alaska produce icebergs, too. The *Exxon Valdez* went aground in Alaska's Prince William Sound partly because it had changed course to avoid icebergs. Scientists have not been observing icebergs long enough to say if there are substantially more of them today. They know that the total mass of ice in Greenland has decreased at an accelerated rate in recent years. In Antarctica, because of its size and other factors, scientists still don't know whether the continent as a whole is losing ice or not.

Some people have jobs that involve thinking about ice and icebergs all day long. A while ago I went to the National Ice Center in Suitland, Maryland, and met a few of them. The Ice Center is affiliated with the National Oceanic and Atmospheric Administration, the Coast Guard, and the Navy. The offices of the Ice Center are in one of the many long, three-story government buildings with extra-large satellite dishes on their roofs in a fenced-in, campus-like setting just across the Potomac from Washington. Antennae poking up from behind clumps of trees add to the spy-thriller atmosphere. The Ice Center's supervisor, a lieutenant commander in the Navy — many of the people who work at the center are military personnel — introduced me to Judy Shaffier, an ice analyst. She is a slim woman in her mid-thirties with a shaped haircut and avid dark eyes accustomed to spotting almost invisible details. An ice analyst looks at satellite images of ocean ice on a computer screen, compares the images to other weather information, and figures out what they mean. "It's a great job, really neat to tell people about at a party or something," Shaffier said. "But it takes explaining. When I say I analyze ice, sometimes people don't get that I mean *ice*. They think it must be one of those government-agency acronyms."

Much of the Ice Center is closed to visitors. That's the part where it pursues its main purpose, which is to provide classified information on ice conditions to the military. For example, a nuclear submarine can break through ice 3 feet thick or less; the center can tell a submarine how close to surfaceable ice it is. Many countries — Japan, Denmark, Great Britain, Russia, France, Sweden — have ice-watching agencies similar to the Ice Center. Any country involved in global ocean shipping needs ice information sometimes.

Providing it to merchant ships, scientific expeditions, and the general public is the nonclassified part of the center's job.

Shaffier led me into a room with darkened windows and computers all along the walls. The glow of screens in the dimness lit the faces of ice analysts tapping on keyboards, summoning up satellite pictures of ice-covered oceans and seas. "I was trained as a meteorologist originally," Shaffier said. "I started analyzing ice in '94. Mostly what we do here is sea ice. Each of us has areas we concentrate on. Mine are the Yellow Sea, the Sea of Okhotsk, the Ross Sea, and the Sea of Japan. I feel like I really know the ice in those seas. Tracking icebergs is kind of secondary. We do it to keep everyone informed about possible dangers in the shipping lanes — in the Southern Hemisphere only, because another agency handles North Atlantic bergs. Also, I guess we do it for scientific and geographic reasons, or because icebergs are just interesting.

"For us to track an iceberg it must be at least 10 nautical miles long," she continued. "We label each one according to the quadrant of Antarctica where it broke off. The quadrants are A through D, and after the letter we add a number that's based on how many other bergs from that quadrant we've tracked since we started doing this back in 1976. The A quadrant, between 90 west longitude and zero, has shelves that calve big icebergs all the time, and we've tracked a lot of bergs from there. A-38 was a recent one. And if a berg breaks up into pieces, any piece that's bigger than 10 nautical miles gets its own label, like A-38A, A-38B, and so on."

The subject turned to giant "celebrity" icebergs and whether she had a favorite.

"In March of 2000 I was sitting at this computer," she said. "Another analyst, Mary Keller, was sitting at the next one, and suddenly she said, 'My God! It's a huge iceberg!' A huge piece had broken off a shelf in the B quadrant since we'd last checked, a day or so before. There had been no stress fractures visible in the ice sheet; the calving was completely unexpected. This iceberg was the fifteenth in B, so we labeled it B-15. I had never seen a berg that size. It was awesome — 158 by 20 nautical miles. After it broke off, it kind of ratcheted itself along the coast, sliding on each low tide, slowly moving from where it began, and in the process it eventually split into two pieces, one of about 100 miles long and another of about

80. B-15 was the most exciting iceberg I've watched since I've been here."

Shaffier and I spent hours looking at computer images that hopscotched the icy places of the globe. Some of the pictures were visible-light photographs; some were made by infrared imagery that indicated different ice temperatures by color. Iceberg ice is 20 or 30 Celsius degrees colder than sea ice, old sea ice is a few degrees colder than new sea ice; in general, the colder the ice, the more difficult it is to navigate through. In passing, we checked up on B-15A — the giant was partly blocking the entry to West Antarctica's McMurdo Sound, apparently stuck on underwater rocks.

"Let's look at the Larsen Ice Shelf, or what's left of it," Shaffier said. "Did you hear what just happened to Larsen B? The Larsen Shelf is in a part of West Antarctica where local temperatures have gone up 4 or 5 degrees over the past decades, and a few years ago a big part of the shelf, Larsen A, disintegrated almost completely. People said that the rest of the shelf, Larsen B, would probably go in the next two years. Well, a few weeks ago it went. Over a thousand square miles of ice — *poof.* One day the shelf was there, the next day it started to break up, and 35 days later the satellite images showed nothing but dark water and white fragments where solid white ice used to be. In about a month this major geographic feature of Antarctica ceased to exist."

Later, a glaciologist I talked to explained how the breakup of Larsen B probably occurred: Higher surface temperatures created pools of meltwater that accumulated on the ice during the summer months until the water flowed into ice crevices; once in the crevices, the water became a hydraulic wedge, forcing its greater weight down through the ice and cracking it apart. When pieces of the ice broke off, they pushed over the pieces next to them, like books falling on a shelf. The process had a swiftness and a magnitude glaciologists had never seen before, and it created the largest movement of ice in a single event in recent times. Unlike the calving of giant icebergs, the Larsen Shelf breakup occurred because of a sharp rise in local temperatures, which scientists believe was almost certainly the result of global warming.

"Actually, I've never seen an iceberg except in pictures," Shaffier told me. "The only ice on my computer screen I've ever seen in person was ice on Lake Erie near Brook Park, Ohio, where I used

to live. Next fall I might get a place on the supply ship going down to McMurdo. I'd love to do that. I want to see the ice up close, but even more I want to hear it. The images on my screen are silent, of course. But think about when an iceberg 200 miles long by 21 miles wide breaks off Antarctica. Think what that sound must be."

According to scientists, probably no one has ever heard that sound or been present when a giant Antarctic iceberg calved. Whether that event is even accompanied by sound audible to humans, no one can yet say. Instruments that listen for underwater oceanic sounds sometimes pick up vibrations like a cello bow across strings — only much lower, below human hearing — which are believed to come from the friction of giant icebergs, though none of the vibrations have yet been matched to a specific calving. When giant icebergs run into something, however — when they collide with the ocean bottom or the land — they cause seismic tremors that register at listening stations halfway around the world.

I wanted to see an iceberg myself. Like Judy Shaffier, I had never seen one live. I took a cab from my house in New Jersey to Newark Airport and flew to Halifax, Nova Scotia, one of those far northern airports where connecting passengers half-sleepwalk in a twilight of individual time zones. From Halifax I flew to St. John's, Newfoundland, on an uncrowded plane over the coastline and then across ocean that was mailbox blue. I had my face close to the window, craning my neck to scan. A finger of Newfoundland appeared directly below the plane. In the other direction, on the ocean far to the east, I saw a blip of white. It got bigger as the plane approached, and I could make out what seemed to be two white oil-storage tanks rising from the ocean's surface. They looked so plausible, I was sure that was what they were. At slightly closer range, the deception fell away, and I saw they were both parts of a single iceberg; and moreover, one of the dry-dock kind I'd read about. This sighting excited me beyond all measure. From home to iceberg was about two hours of flying time.

The plane banked to the west and descended to land at St. John's, and at about a thousand feet it came over a high bluff above a fjordlike little bay, and in the middle of it was a large, tent-shaped iceberg. The plane passed over the iceberg in a second and five minutes later was at the gate. I hurried to the luggage claim, got my

bag, picked up my rental car, and drove back to the bay where the iceberg was. At a turnout by the road skirting the bay, I got out. The berg rode there, rotating slightly back and forth, about 200 yards away. Its top had a sort of spinal effect, with knobs in a curving row like vertebrae. Small waves broke around it, and it seemed to give off a mist.

Icebergs are really white. Usually you don't see this kind of white unless you've just been born or are about to die. It's a hazmat suit, medical lab, hospital white. There are some antiseptic-blue overtones to it, too, and a whole spectrum of greens where the berg descends into the depths out of sight. In these latitudes, sea and land and sky wear the colors of hand-knit Scottish sweaters: the taupes, the teals, the tans, the oyster grays. Surrounded by these muted shades, icebergs stand out like sore thumbs, if a sore thumb could gleam white and rise five stories above the ocean and float.

I drove hundreds of miles up and down the Newfoundland coast looking for icebergs. When I spotted an iceberg in close, run aground on a point or in a cove, I went toward it in the car as far as I could and then hiked the rest of the way. One such hike led through meadows, down forest trails, and across slippery shoreline rocks all inclined in the same direction. Finally I got to the iceberg, which looked somewhat like a jawbone. It even had tooth-shaped serrations in the right place as it seesawed chewingly in the waves. Gulls on fixed wings shot past the headland entanglements of weather-killed trees, clouds turned in huge pinwheels above, waves crashed, the iceberg chewed. I had forgotten to bring water and my mouth was dry.

Among the small channels and troughs in the rocks, iceberg fragments were washing back and forth. I leaned down and scooped out a flat, oval piece about ten inches long. The sea had rounded and smoothed the hard, clear ice like a sea-smoothed stone. In it were tiny bubbles of air that had been trapped among fallen snowflakes millennia ago; the air had eventually become bubbles as later snowfalls compressed the snow to ice. Bubbles in icebergs are what cause them to reflect white light. Almost certainly, this piece of ice originally was part of the Greenland ice cap. A glacier like the Jakobshavn Glacier on Greenland's western coast probably calved this ice into Baffin Bay, where it may have remained for a year or more until currents took it north and then south into the Labrador Current, which brought it here.

I licked the ice, bit off a piece. It broke sharply and satisfyingly, like good peanut brittle. At places the Greenland ice cap is two miles thick. Climatologists have taken core samples clear through it. Chemical analysis of the ice and the air bubbles in these cores provides a picture of climate and atmosphere during the past 110,000 years. For a period covering all of recorded human history, the Greenland ice timeline is so exact that scientists can identify specific events with strata in the core sample — the year Vesuvius buried Pompeii, say, marked by chemical remnants of the Vesuvian eruption. In ice core samples dating from the Golden Age of Greece, they've found trace amounts of lead, dispersed into the atmosphere by early smelting processes and carried to Greenland on the winds. Lead traces in the ice increase slowly from Greek and Roman times, stay at about the same level during the Middle Ages, go up a lot after the beginning of the Industrial Revolution, crest during the twentieth century, with its leaded automobile fuels, and drop way off after the introduction of unleaded gasoline. Chemicals and other residues in the Greenland ice cores told scientists about temperatures, droughts, the coming and going of ice ages — more about paleoclimates than they had ever known. In particular, they showed how unstable global climate has been, how abruptly it sometimes changed, and how oddly mild and temperate were the recent few thousand years in which people developed civilization.

Scientifically useful concentrations of chemicals don't affect the purity of Greenland ice. Devices that measure impurities in parts per million usually register none in iceberg ice; to find substances other than air and water in it, measurement must be in smaller concentrations, like parts per billion or per trillion. As I sucked the iceberg piece, contemplating its ancientness, trying to taste the armor of Caesar or the ash of Krakatoa in infinitesimal traces, the pristine cold water seemed to evaporate through my membranes with no intervening stage. Before I finished the fragment, my thirst was gone.

Denny Christian, director of technical support for the Center for Cold Ocean Resource Engineering (C-CORE) in St. John's, is an iceberg guy. Whenever I asked around on the subject of icebergs, his name came up. C-CORE is a company that handles extreme-conditions research-and-development problems, many having to do with oceanic ice. Denny Christian has photographed icebergs,

towed them, measured them, and done experiments on them. When he was younger, he used to put crampons on his feet and climb on them. With other ice technicians, he has landed on them in helicopters and shut the engines down and walked around; he told me he would never do anything so reckless today. A few years ago, against his better judgment, he ferried out two scientists who wanted to climb on a berg and helped them aboard. Then he stood off in his skiff and watched. He heard a noise, saw some of the iceberg come out of the sea, and the next thing he knew, the scientists were clinging to the side of the ice they'd been standing on, 50 feet above the waterline. In another few seconds, the berg had gone over on top of them. By luck and quick boat-handling he was able to fish them out alive.

Denny Christian is tall, stoop-shouldered, snub-nosed, in his mid-sixties. His ancestors were Norwegian. When he strongly wishes to make a point, he widens his eyes with an attention-getting, Norwegian ferocity; other than that, his manner is laconic and mild. Usually he has the stoic patience you get from being around the unobligingness of nature. The only person he ever threw out of his office was a man who went on in great detail about a scheme he had to tow icebergs someplace or other with a submarine he planned to buy. Listening to crazy iceberg schemes is a recurring part of Denny Christian's job.

He and I sat in his office talking icebergs and going through folders of iceberg photos he has taken in his twenty years at C-CORE. The icebergs came in every category of shape and featured many natural parodies of architectural styles from caveman days to now. Some bergs suggested cliff dwellings, some castles; some were like fortresses, or space needles, or ultramodern Jetsons-type mansions in Beverly Hills. A striking iceberg that I had seen photos of before had two foothill eminences joined at the top by a soaring St. Louis Gateway Arch of ice. I stopped at a photo of a large tabular berg with men in red carrying chainsaws and clambering on it.

"These guys were some French environmentalists who wanted to carve a big iceberg in the shape of a whale with other endangered species riding on its back, and then send it down the East Coast of America to make a point about saving the environment," Denny said. "I helped them with the project, but I told 'em, 'You better wear these bright red life jackets so we can find you if you fall in

and *die.*'" His eyes went wide. "Fortunately, the Gulf War came along about that time and their money ran out, and we never heard from them again."

Right now most of the work Denny does at C-CORE is for a group of oil companies that have drilling platforms in the North Atlantic about 350 miles east of St. John's. The oil drillers are worried about icebergs crashing into their platforms or sinking their tankers. Among other problems, C-CORE studies the likelihood of iceberg impacts, how damaging they might be, and how to avert them. Two summers ago Denny harnessed some small icebergs and smashed them into a steel panel rigged with instruments, to learn more about such collisions. Recently he has been studying the iceberg-tracking effectiveness of high-frequency radar that can see over the horizon out to about 250 miles. Every so often he charters a plane and flies out to check the radar's accuracy with his own eyes. When he told me he planned to take one of these "ground-truthing" flights in the next day or two, I asked if I could go along.

First we had to drive to Gander, about four hours from St. John's, to get the charter plane. Michelle Rose, a college intern at C-CORE who assists Denny sometimes, accompanied us. The wind was blowing hard when we reached the airport, but the charter pilots didn't seem to mind. Soon we were bumping and bouncing in a twin-engine plane through the updrafts over the North Atlantic, out of sight of land. Then the plane descended to a low altitude, the turbulence subsided, and we were cruising steadily 500 feet above the waves.

Denny had given the pilots GPS readings corresponding to places where the radar had indicated icebergs. The first one appeared on the plane's right side — a blocky berg with a line of dirt on it like a slash. Denny said that was glacial till that the glacier had scraped from the ground before calving. This next one, a pinnacle berg, had two bright blue lines on it that formed a V. Blue lines, he said, are from meltwater that flows into glacial crevices and freezes there; ice from meltwater lacks the bubbles in glacial ice and reflects blue. As we passed each berg, Denny photographed it and shouted data — shape, size, GPS coordinates — and Michelle Rose wrote them down on a clipboard. The distribution of icebergs did not seem to fit the radar picture very closely, but that slipped from everybody's mind.

Some icebergs we didn't get a good look at on the first pass, and so we swooped back for another. An iceberg like the Rock of Gibraltar caught the sun on a facet of its never-to-be-scaled white peak as we went by. A humpbacked berg nosed through the waves with homely persistence as if going somewhere. We checked out eight icebergs in all. Each was completely by itself in a sun-sparkled immensity of ocean, each had contours and particularities as distinctive as a face. The imitations they did of habitable places inspired a hopelessness that was almost sublime. Not much in nature makes you feel as lonesome as an iceberg does. Perhaps that's the reason we don't give them names: the uncomfortable parallel to our own diffusible selves.

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Through Denny Christian I met a St. John's captain named Ed Kean. When the ocean still held lots of cod, four generations of Ed Kean's Newfoundland ancestors fished for them. Ed has an all-purpose 75-foot boat with twin diesel engines and a 5-ton crane amidships. The boat's name is *Mottak,* which he says is Inuit for "boat." He uses it for a miscellany of jobs. When a ship undergoing repairs offshore needs a large part ferried out to it, Ed does that. If a film crew shows up wanting to make a nature documentary for Japanese television, he takes them around. April through September, when icebergs are in local waters, Ed harvests iceberg ice. In the *Mottak* he searches for likely-looking pieces — the size of VW Beetles or small sports cars is about right — and when he finds them he sends his crewmen in a skiff and they wrap the iceberg pieces in nets and tow them back to the boat. Then Ed winches them out of the sea and into the hold. Back in port, he sells the ice to the Canadian Iceberg Vodka Corporation, which makes their triple-distilled Iceberg Vodka from it. Last year Ed sold the company almost a million liters of melted icebergs.

Before I knew what Ed looked like, I recognized him from his walk. He walks with the rolling gait of a sailor, feeling the floor for a moment with each foot before setting it down. Until I met him, I assumed that this nautical way of walking was extinct, or a conceit of literature. Ed roll-walked across the lobby of the Holiday Inn, where I was staying, and shook my hand. We'd arranged to meet there so I could go out on his boat and watch him gather iceberg ice. We drove out to where he docks his boat, in a little harbor

northeast of St. John's. Fishermen seem to have an accent different from the crisp, clipped speech of other Newfoundlanders; as near as I can tell, it's part Irish, part Cockney. "Beautiful day for 'arvestin' oiceberg oice," Ed said, as he scanned the blue sky.

Also onboard the *Mottak* that day were two crew members, both named Tony, both tanned dark brown and with deeply lined, sun-reddened eyes; Denny Christian, hoping to see an unusual iceberg Ed had promised to show him; Denny's wife, Thelma, an iceberg enthusiast like her husband; me; and a producer-director, a cameraman, a soundman, and an on-camera personality named Kevin, all from a cable television show called *The Thirsty Traveler.* This show began on a food network in Canada. In each half-hour episode it visits a different part of the world and samples an emblematic local alcoholic drink. In just the last few weeks, the crew had done sake in Japan, tequila in Mexico, and ouzo in Greece. Now they were doing Newfoundland and iceberg water vodka.

The ocean rose in gentle swells as the *Mottak* headed south along the coast, past an island called Bell Island. Denny joined me at the rail and said that the water we were on used to hide German submarines. Twice during World War II, a U-boat came into this narrow stretch between the island and the shore, waited for an opportunity, and torpedoed boats loaded with ore from the Bell Island iron mines. On clear days when the light is right, you can see the sunken tankers on the bottom. Scores of sailors died in the attacks, and each time the sub got away. Denny pointed to the coastline, indented all along its length with big and little coves. "People used to say that sometimes U-boats would pull into one of the coves, and then the German sailors would put on civilian clothing and come into St. John's and go to the movies," he confided.

After we'd been dieseling for a couple of hours, Ed pointed to an iceberg straight ahead. Another hour and a half passed as the berg grew larger with almost undetectable slowness. At about a quarter mile, you could see that the berg was immense, tabular, and completely brown on top; at a hundred yards, it looked as if badly financed developers had abandoned a housing project on it while still at the bulldozing stage. Dirt and gravel and large rocks were strewn all over in heaps and piles. Denny said he had never seen this much glacial till on an iceberg. The sun was hot by now, the wind had become brisk, and the melting edges sent mini-ava-

lanches of gravel raining down. If an iceberg can be described as having a fit, this one was. Rocks clacked and splashed all around it, little waterfalls streamed from it every few feet, pieces of ice fell off the sides and shattered and bobbed. When iceberg ice melts quickly, the bubbles released from it make a sound like soda water fizzing. A piece of ice as big as a bedroom fell splintering into the sea, and its myriad fragments, when they came back to the surface, fizzed full-throatedly.

With a rifle, Ed fired a couple of shots at the iceberg. The idea was to knock loose a conveniently sized piece. From the white cliff, some ice chips flew, but nothing big fell down. After the second shot, Thelma shouted that she had seen a fox — that an arctic fox had come to the edge of the berg, peered over, and ducked back. Denny said it happens sometimes that foxes and other animals get stranded on icebergs when they drift free. All of us stood and waited for the fox to reappear at the ledge of dirty ice and gravel 30 feet above the boat deck, but it didn't. Thelma kept saying that she was sure she'd seen it, and that the fox had looked miserable and skinny.

After some to-ing and fro-ing at the request of the TV people — approaching the iceberg now this way, now that, for the best angle and light — Ed motored around to its shoreline side. Acres of ocean dotted with iceberg pieces extended in all directions. The Tonys launched the skiff and began to harvest; securing nets around unwieldy car-size pieces of ice floating in 41-degree water can't be as easy as they made it seem. As the cameraman filmed, Kevin, the on-air person, gamely jumped into the skiff and assisted with the net-handling. Overseeing from the deck, Ed supplied his own dialogue: "Oh, you'll 'ave to do better 'n that, boys!" he sang out when they brought a smaller-than-usual piece alongside.

The air filled with the pleasant click of grapples, the substantial thumps of boated ice, the whining of the crane, the slap of the waves. During a lull, an iceberg piece too big to bring aboard drifted up beside the *Mottak*'s stern. This piece was about the size of six parking spaces and almost level with the water. It had a section like a pulpit rising from one side. I lay facedown on the stern and leaned my head over to within inches of the living ice. At this distance it glistened with the dull, wet gray of cubes in an ice cube tray, and its surface was pitted with little depressions. With a push I could have slid onto it and drifted away. Just as I was thinking that, a corner of the stern knocked, not hard, against it. In an instant, the entire piece of ice split in two. The section with the pulpit angled precariously upward from the water and then rotated its former top to deep below. The movement had the succinctness of a wall revolving to reveal a hidden door. It sent a sympathetic, shivery rush from my spine to the backs of my knees.

Ed filled the hold with iceberg pieces and piled others on the deck. Late in the afternoon he headed for port, first making another close pass by the big iceberg. Thelma was watching out for the fox, and she and Denny and one of the Tonys caught a glimpse of it near where it had been before. They said it was running along the edge of the iceberg, trying to keep up with the progress of the boat. Thelma wanted to call the Humane Society and get them to send a helicopter to pick up the fox. Its prospects did not look good out there, miles from land and with no company but the gulls. Thelma stayed in the stern, scanning the iceberg with binoculars, as we motored away.

In a booklet written for iceberg enthusiasts, a St. John's engineer and history buff named Stephen E. Bruneau mentions a locally famous iceberg called the Virgin Berg. It was an iceberg "hundreds of feet high and bearing an undeniable likeness to the Blessed Virgin Mary" (as one account described it) that appeared off St. John's harbor in June of 1905. Thousands of people went to a high hill above St. John's to watch it drift by, and the fishing boats that came out to follow it became a flotilla as it continued on its way south along the coast. Catholic and Protestant Newfoundlanders took it as a sign — generally, as a mark of divine favor for the Catholic side.

Probably there were also a few skeptics who saw it as just a big piece of ice in the water. My own mild fanaticism for icebergs can sometimes be hard to explain to unconvinced acquaintances. I notice the bewilderment in their eyes, and it infects me: Why, exactly, should anyone get so worked up about a piece of ice? Like the Newfoundland faithful of a hundred years ago, each of us sees in an iceberg what we are disposed to see. And yet . . . if icebergs have no significance other than the fanciful notions we project, why do they look as they do? A white iceberg lit by the sun in a field of blue

ocean simply *looks* annunciatory. It might as well have those little lines radiating from it — the ones cartoonists draw to show something shining with meaning. In its barefaced obviousness, an iceberg seems the broadest hint imaginable; but what is it a hint of?

When I went to the Ice Center, Judy Schaffier gave me a list of ice-watch Web sites run by government agencies in a dozen countries. All across the United States and Canada are institutes and university departments that devote some or all of their resources to studying the world's ice. From the earth and the sky, ever more sophisticated instruments constantly record tiny changes in the ice. A satellite that measures global sea levels, a key part of ice studies, takes 500,000 sea level readings a day. Laser altimeters deployed on satellites can detect the minutest shifts of ice position with essentially no error. And yet, with all this information flooding in, broad conclusions are hard to come by. Science is specialization, and almost no expert in a particular area wants to step out into summary or generalizing. The experts tend to approach big ideas like global warming with the greatest hesitancy. Apparently, nobody wants to be the one to tell us (for example) that our SUVs have got to go.

What science will hazard instead of conclusions is a series of ifs. Ten thousand or 20,000 square miles of ice broken off Antarctica hardly diminishes that continent's total ice area of 5 million square miles, but *if* the shedding of ice continues at an increasing rate, and *if* the ice loss causes the glaciers inland to move faster toward the sea, and *if* seawater flows in where glacial ice used to be and reaches certain sub-sea-level parts of the continent and melts the ice there, and *if* as a consequence the entire West Antarctic Ice Sheet goes — well, then we would have the schnitzel, to speak plainly. That much ice added to the ocean might raise world sea levels anywhere from 13 to 20 feet. Such a rise would submerge parts of the island of Manhattan and of the Florida peninsula, not to mention many other coastal areas worldwide where about half the planet's population lives.

News stories in the months following the *Titanic* disaster examined the preceding few years' weather conditions in the Arctic and North Atlantic and concluded that a number of meteorological features had been "unusual." The winter of 1910–11 had been "unusually" snowy and severe, the summer of '11 and the spring of '12

had been "unusually" warm, the icebergs had drifted "unusually" far south. Such descriptions bring to mind the TV weather forecasters who still speak of temperatures as being "unseasonably" warm; most of the years in the last two decades have been warmer than any recorded in decades previous, so what does "unseasonable" mean nowadays? In fact, from an expanded perspective of time, there is nothing unusual about so many icebergs being as far south as the place where the *Titanic* went down. Over the past millennia, as climatic events came and went, icebergs invaded the Atlantic in armadas. Stones dropped from melting Canadian icebergs have been found in sea sediments off the coast of Portugal. The North Atlantic climate over the last tens of thousands and hundreds of thousands of years has been characterized by periods of continent-wide glaciation, massive melting, and the intermittent huge discharge of icebergs.

As easily as The Iceberg fits a morality tale about human pride, it fits a climatologist's possible scenario of global warming ifs. If increased moisture held in the warmer atmosphere results in more precipitation in the North Atlantic region, and if that precipitation leads to more runoff into the ocean, and if warmer summers result in a greater melting of glacial ice in Greenland, and if lots more icebergs set sail, and if all that leads to a greatly increased amount of fresh water poured every year into the North Atlantic — then, possibly, the complicated process of tropical warm water rising, flowing north, giving off its heat, and cooling and sinking (the process that creates the great ocean currents) will be disrupted. And if those currents stop, and the heat they bring to northern Europe and parts of the United States and Canada no longer arrives, those regions will very likely become colder, like other places at similar latitudes that ocean currents don't warm.

Of course no one imagined any such scenarios back in 1912. Most people knew little or nothing about climatology. Yet it might turn out that a foreshadowing of major climate change in that part of the world was the real message The Iceberg carried for us out of the North Atlantic night.

And then again, maybe not. Discussions of global warming always deal in elaborate, scary possibilities, while always including enough disclaimers and unknowns to blunt the fear. Considering all that's at stake, I want to tell us what we should do immediately to

change our lives and avert environmental catastrophe. But I can't bring myself to, somehow. All I can do is put in a good word for the sweeping conclusion and broad generalization. There aren't enough of them around — enough high-quality ones, I mean. I think we have yielded the sweeping-conclusion field to the wackier minds among us. Scenarios based on the Mothman Prophecies are colorful, but not a lot of help in the long run. Sensibly, most of us fort up behind our ever-growing heaps of information. But eventually, and maybe soon, we should draw a conclusion or two about where the globe is heading; and after that, maybe even act.

A lot of what is exciting about being alive can't be felt, because it's beyond the power of the senses. Just being on the planet, we are moving around the sun at 67,000 miles an hour; it would be great if somehow we could climb up to an impossible vantage point and just for a moment actually *feel* that speed. All this data we've got piling up is interesting, but short on thrills. Time, which we have only so much of, runs out on us, and as we get older we learn that anything and everything will go by. And since it will all go by anyway, why doesn't it all go right now, in a flash, and get it over with? For mysterious reasons, it doesn't, and the pace at which it proceeds instead reveals itself in icebergs. In the passing of the seconds, in the one-thing-after-another, I take comfort in icebergs. They are time solidified and time erased again. They pass by and vanish, quickly or slowly, regular inhabitants of a world we just happened to end up on. The glow that comes from them is the glow of more truth than we can stand.

JAMES GORMAN

Finding a Wild, Fearsome World Beneath Every Fallen Leaf

FROM *The New York Times*

CONCORD, MASS. — Dr. Edward O. Wilson, Pellegrino University Research Professor and honorary curator in entomology of the Museum of Comparative Zoology at Harvard University, winner of two Pulitzer Prizes and scientific honors too numerous to recount, is on his hands and knees, pawing in the leaf litter near Walden Pond. He eases into a half-sitting, half-reclining position and holds out a handful of humus and dirt. "This," he says, "is wilderness."

Just a dozen yards from the site of Thoreau's cabin, Dr. Wilson is delving into the ground with a sense of purpose and pleasure that would instantly make any ten-year-old join him. His smile suggests that at age seventy-three, with a troublesome right knee, he still finds the forest floor as much to his liking as a professor's desk.

These woods are not wild; indeed, they were not wild in Thoreau's day. Today, the beach and trails of Walden Pond State Reservation draw about 500,000 visitors a year. Few of them hunt ants, however. Underfoot and under the leaf litter there is a world as wild as it was before human beings came to this part of North America.

Dr. Wilson is playing guide to this microwilderness — full of ants, mites, millipedes, and springtails in a miniature forest of fungal threads and plant detritus in order to make a point about the value of little creatures and small spaces. If he wrote bumper stickers rather than books, his next might be "Save the Microfauna" or "Sweat the Small Stuff."